IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of	:	
	:	
CHIU, et al.	:	
	:	
Serial No.	:	Group Art Unit:
	:	
Filed:	:	Examiner:
	:	
For: BULKING AGENTS AND PROCESSES FOR PREPARING THEM FROM FOOD GUMS	:	

INFORMATION DISCLOSURE STATEMENT PURSUANT TO 37 C.F.R. 1.97

Commissioner of Patents and Trademarks
Washington, D. C. 20231

SIR:

Takahashi, H., Dietary Fiber From Guar Plant Seed, Technical Bulletin, Taiyo Kagaku Company, Limited, March, 1990, ("Takahashi") discloses a product called "Sunfiber" which is a purified low molecular weight guar gum which has been digested with a beta-D-mannanase produced by Aspergillius niger. Takahashi discloses that Sunfiber has a molecular weight from 24,000 to 30,000, and has beneficial physiological effects in the human diet, including reduced serum lipid levels, reduced gastrointestinal transit time, reduced serum cholesterol, and improved glucose tolerance. Takahashi also discloses certain functional characteristics of the Sunfiber product, including its use as a dietary fiber, a film former, a foam stabilizer, a swelling agent, a syneresis inhibitor, and a colloid protector. Takahashi does not disclose the use of this product as a bulking agent. Further, Takahashi does not teach that the guar gum may be enzymatically degraded to an average DP of 3 to 75, nor that such a highly degraded guar gum has beneficial functional properties as a sugar replacement.

European Patent Application No. 0,301,440 of Barnett, et al., published February 1, 1989 ("Barnett") discloses water soluble bulking agents comprising modified and unmodified hemicelluloses, which may serve to replace the functional properties of carbohydrates or fats in food formulations. Barnett discloses that the hemicelluloses may be modified by treatment with acid or enzyme to break down the polysaccharide to lower molecular weights, including oligosaccharides composed of only 4 to 10 sugar units. Barnett discloses that hemicellulose A may be treated with a xylanase or cellulase to degrade the hemicellulose to the desired degree. Also disclosed is the degradation of hemicellulose B with an enzyme preparation containing hemicellulase and

cellulase. Barnett does not disclose that bulking agents may be prepared from food gums, such as the galactomannans and xanthan gum employed by Applicants herein. Further, Barnett does not disclose that the depolymerization process is necessary to the production of a functionally suitable bulking agent. Finally, Barnett's invention is directed to the use of nonwoody lignocellulosic substrates such as corn bran, alfalfa hay, oat bran, citrus pulp, peanut shells and soy bean stover, having a pentose polymer backbone.

European Patent Application No. 0,251,798 of Jensen, et al., published January 7, 1988 ("Jensen") and its U.S. equivalent: U.S. Pat. No. 4,871,571, issued October 3, 1989, to Jensen, et al., discloses low calorie bulking agents comprising a glucose oligomer(s), having a DP of 3 or 4 and one beta-1,3-glucosidic bond, the balance of the other bonds being 1,4 bonds. Jensen teaches that these bulking agents may be produced by the hydrolysis of beta-glucan. The process comprises grinding barley, liquification and saccharification with enzymes, termamyl™ and amyloglucosidase. This is followed by further separation steps and hydrolysis with a beta-glucanase which is then inactivated prior to isolation of the bulking agent. In contrast with Applicant's invention, these agents, and the material from which they are derived, are not heteropolysaccharides.

Patent Cooperation Treaty Application No. WO 89/04609, of Singer, et al., published June 1, 1989, discloses a bulking agent comprising cellobiitol which may be used in combination with a high potency sweetener to provide the functional characteristics of sucrose in formulated foods without high caloric content. Unlike Applicant's invention, this bulking agent is chemically produced and comprises a disaccharide of glucose and sorbitol.

The following U.S. patents disclose bulking agents which may be employed in food formulations:

4,376,198, issued March 8, 1983, to Divivedi, et al.
4,024,290, issued May 17, 1977, to Layton
4,526,794, issued July 2, 1985, to Altomare, et al.
3,766,165, issued May 25, 1972, to Rennhard, and
4,451,489, issued May 29, 1984, to Beale, et al.

None of these patents disclose the depolymerization of naturally-occurring gums to provide bulking agents suitable for use in reduced calorie edible formulations.

The following U.S. patents disclose high potency or low calorie sweeteners which may also be employed as bulking agents in foods:

4,459,316, issued July 10, 1984, to Bakal
4,786,722, issued November 22, 1988, to Sehner

Neither of these patents disclose the bulking agents claimed by Applicants herein.

Tamrind Seed Polysaccharide:Glyloid:Thickening Stabilizing and Gelling Agent, Technical Bulletin, Dainippon Pharmaceutical Company, Inc., Osaka, Japan (1982) ("Glyloid Technical Bulletin") discloses background information on the characteristics and use of tamrind seed gum.

Physiological Effects of Food Carbohydrates, American Chemical Society Symposium Series No. 15, Jeanes, A. and Hodge, J., Editors, ACS, Washington, D. C. (1975) ("Jeanes and Hodge") discloses background information on the digestibility and metabolism of the food gums employed by Applicants herein in the preparation of bulking agents. Likewise, the three references (authored by Shiau and Salyers) listed on page 3 of Applicants' PTO-1449 form submitted herewith, provide information on the physiological effects of the heteropolysaccharides employed by Applicants herein. These three articles are directed to metabolism of these heteropolysaccharides in the lower intestine by microbial flora.

The articles listed on page 2 of Applicants' PTO-1449 form (authored by Layton and Beereboom) provides background information on the state of the art in low calorie food bulking agents.

The disclosure of the above references does not constitute an admission that they are relevant or material to the claims or are "prior art" to the subject application. The citation of them is not to be construed as a representation that no better art exists or that a search has been made, they are cited merely as constituting collectively the closest art of which the Applicants are aware.

Respectfully submitted,

Mary E. Porter

Mary E. Porter, Reg. No. 33,440
Patent Attorney
Tel. No. 201-685-5127

"Express Mail" mailing label number AB176417263
Date of Deposit May 17, 1990
I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Post Office Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231.

Mary E. Porter
Typed or printed name of person mailing paper or fee

Mary E. Porter
Signature of person mailing paper or fee

National Starch and Chemical Company
P. O. Box 6500
Bridgewater, New Jersey 08807

May 15, 1990

FORM PTO-1449 (REV. 7-80) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTY. DOCKET NO.	SERIAL NO.
1358	
APPLICANT: Chiu, et al.	
FILING DATE	GROUP

LIST OF REFERENCES CITED BY APPLICANT

(Use several sheets if necessary)

U.S. PATENT DOCUMENTS

*EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
	AA	4 4 5 1 4 8 9	5/84	Beale, et al.	426	254	
	AB	4 0 2 4 2 9 0	5/77	Layton	426	548	
	AC	4 3 7 6 1 9 8	3/83	Dwivedi, et al.	536	4.1	
	AD	4 5 2 6 7 9 4	7/85	Altomare, et al.	426	258	
	AE	3 7 6 6 1 6 5	10/73	Rennhard	260	209 R	
	AF	4 4 5 9 3 1 6	7/84	Bakal	426	658	
	AG	4 7 8 6 7 2 2	11/88	Zehner	536	1.1	
	AH	4 8 7 1 5 7 1	10/89	Jensen, et al.	426	548	
	AI	4 6 2 6 4 4 1	12/86	Wolkstein	426	548	
	AJ						
	AK						

FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES	TRANSLATION NO
	AL	0 2 5 1 7 9 8	1/7/88	European Patent Office				
	AM	0 3 0 1 4 4 0	2/1/89	European Patent Office				
	AN	W 0 8 9 0 4 6	09 6/1/89	PCT -US Priority				
	AO							
	AP							

OTHER REFERENCES *(Including Author, Title, Date, Pertinent Pages, Etc.)*

	AR	Takahashi, H., Dietary Fiber From Guar Plant Seed, March, 1990, Technical Bulletin, Taiyo Kagaku Company Ltd., 20 pages.
	AS	Tamarind Seed Polysaccharide: Glyloid: Thickening: Stabilizing and Gelling Agent, Technical Bulletin, Dainippon Pharmaceutical Co., Inc. Osaka, Japan, 1982, 14 pages.
	AT	Physiological Effects of Food Carbohydrates, American Chem. Society Symposium Series No. 15, Jeanes, A. and Hodge, J., Eds., ACS, Washington, D.C. 1975, pp. 267-347.

EXAMINER	DATE CONSIDERED

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

FORM PTO-1449 (REV. 7-80) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

LIST OF REFERENCES CITED BY APPLICANT
(Use several sheets if necessary)

ATTY. DOCKET NO.	SERIAL NO.
1358	
APPLICANT: Chiu, et al.	
FILING DATE	GROUP

U.S. PATENT DOCUMENTS

*EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
	AA						
	AB						
	AC						
	AD						
	AE						
	AF						
	AG						
	AH						
	AI						
	AJ						
	AK						

FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES	TRANSLATION NO
	AL							
	AM							
	AN							
	AO							
	AP							

OTHER REFERENCES *(Including Author, Title, Date, Pertinent Pages, Etc.)*

	AR	Layton, R. M., et al., Glucosylsorbitol adds Bulk Without Sweetness, Calories, Food Product Development, Vo. 12, No. 2, 1978, page 53.,
	AS	Beereboom, J.J., Low Calorie Bulking Agents, Low Calorie and Special Dietary Foods, Dwivedi, Basant, K., Ed., CRC Press pp. 39-50.
	AT	Shiau, S., and Chang, G.W., Effects of Dietary Fiber on Fecal Mucinase and Beta-Glucuronidase Activity in Rats, J. Nutrition, Vol. 113, No. 1, 1983, pp. 138-144.

EXAMINER	DATE CONSIDERED

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

FORM PTO-1449 (REV. 7-80) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTY. DOCKET NO.	SERIAL NO.
1358	
APPLICANT: Chiu, et al.	
FILING DATE	GROUP

LIST OF REFERENCES CITED BY APPLICANT

(Use several sheets if necessary)

U.S. PATENT DOCUMENTS

*EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
	AA						
	AB						
	AC						
	AD						
	AE						
	AF						
	AG						
	AH						
	AI						
	AJ						
	AK						

FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES	TRANSLATION NO
	AL							
	AM							
	AN							
	AO							
	AP							

OTHER REFERENCES *(Including Author, Title, Date, Pertinent Pages, Etc.)*

	AR	Salyers, A.A., Energy Sources of Major Intestinal Fermentative Anaerobes, Amer. J. Clin. Nutrition, Vol. 32, Jan. 1979, pp. 158-163.
	AS	Salyers, A.A., et al., Degradation of Polysaccharides by Intestinal Bacterial Enzymes, Amer. J. Clin. Nutrition, Vol. 31, Oct. 1978, pp. S128-S130
	AT	

EXAMINER	DATE CONSIDERED

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.